OAM and LPI Wake

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Issues with OAM during Wake – pt 1/2

- Currently the 802.3cy standard allows live OAM frames during Wake

- For L = 1, OAM frames start at the beginning of Wake
  – For L > 1, OAM frames are still able to start at the beginning of Wake

- But Wake frames are not guaranteed to be error free
  – Wake is intended for RX DSP recovery
  – The first 8 Wake frames are more prone to errors than the last 8 Wake frames

- An error in more than one OAM symbol causes an uncorrectable OAM frame
  – Incurs a latency of 5.32 us until the next OAM frame
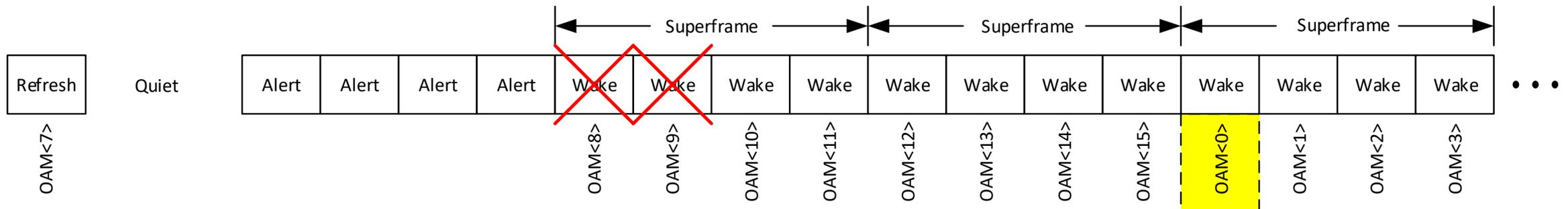
Issues with OAM during Wake – pt 2/2

- It's difficult to predict what other uses will arise for OAM data

- Some future uses of OAM data may need the latency to be as low as possible

- We should ensure the OAM frame reliability during Wake

- Example 1000BASE-T1 TC10 uses OAM<0>[5:4] for WUR and LPS
  - OAM<0>[5:4] are not covered by the OAM ECC and don't utilize the OAM handshaking
  - The TC10 language states OAM<0>[5:4] is available for one frame
  - The LPS handshaking is slow and the latency penalty for missing an LPS is long

	D8	D7	D6	D5	D4	D3	D2	D1	D0
Symbol 0	Even Parity	Reserved	Reserved	Reserved	Reserved	PingRx	PingTx	SNR<1>	SNR<0>
Symbol 1	Odd Parity	Valid	Toggle	Ack	TogAck	Message_Number<3:0>			
Symbol 2	Odd Parity	Message<0><7:0>							

WUR → D5   LPS → D4
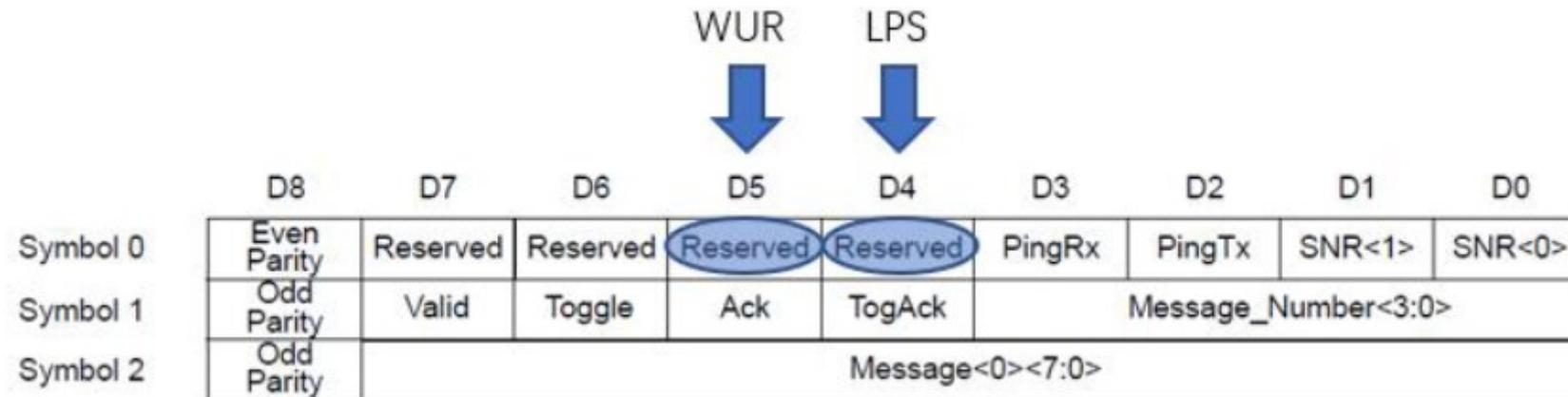
Solution: Insert 8 dummy OAM symbols during Wake frames

- Allows time for convergence
- Ensures OAM symbols have SNR similar to that of customer data
- Adds 2.66 us latency to decoding an OAM frame at the Wake transition

Current
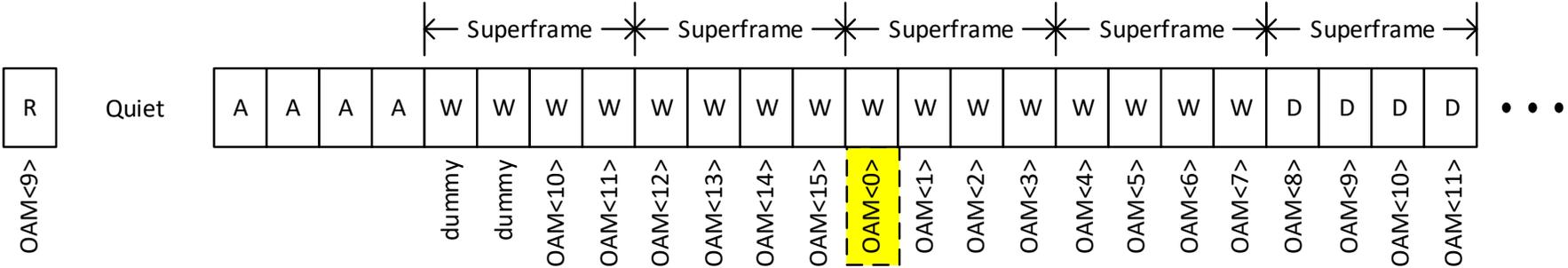
Proposed
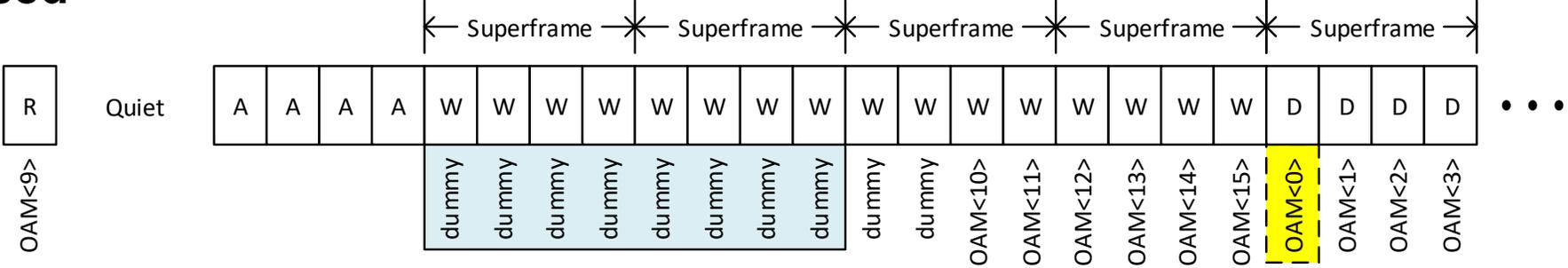
Comment – pt 1/2

- Delete lines 34-39, page 88, in 165.3.9.2.1

- Replace with the following text from 802.3ch, page 126, in 149.3.9.2.1 with these insertions (underlined):

When transitioning from Low Power Idle to normal operation, it is possible that part of the OAM frame is sent over the LPI refreshes and the remainder of the OAM frame is packed in RS frames. In this case the first 8 frames of Wake shall contain dummy OAM symbols. After that, in some instances, it is possible that the remainder of the OAM frame cannot be aligned where the next OAM frame will have its first symbol (OAM<0>) inserted in the first RS frame of the superframe. In such cases, the partially transmitted OAM frame shall be interrupted according to the following rules:

1x interleaving — no interruption is required.

2x interleaving — insert 0 or 1 dummy OAM symbol into the superframe for alignment before continuing.

4x interleaving — insert 0 to 3 dummy OAM symbols into the superframe for alignment before continuing.

8x interleaving — insert 0 to 7 dummy OAM symbols into the superframe for alignment before continuing.

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Comment – pt 2/2

The receiver can anticipate when the dummy OAM symbols will be inserted based on the sequence of refresh and wake events.

The dummy OAM symbol is all 0's and its value is ignored at the receiver.

An example in Figure XXX-XX shows the fixed eight dummy OAM symbols followed by the two dummy OAM symbols inserted to realign OAM<0> to the 4x interleaved superframe boundary.